

WHAT IS CLAIMED IS:

1. A plastic-metal composite article comprising,
at least one first shaped metal part and at least one second shaped
5 metal part, each of said first and second shaped metal parts having an
overlap region defined by a portion of said second shaped metal part being
superposed over a portion of said first shaped metal part,
wherein said first and second shaped metal parts are fixedly attached one to the
other by
10 an adhesive interposed between said first and second shaped metal
parts in said overlap region, and
thermoplastic material molded onto at least a portion of said overlap
region,
further wherein said first and second shaped metal parts are substantially free of
15 direct contact with each other in said overlap region, and said adhesive provides
an electrically insulating layer between said first and second shaped metal parts in
said overlap region.
2. The plastic-metal composite article of Claim 1 wherein said first and
20 second shaped metal parts are each fabricated from at least one of different metals
and different metal alloys.
3. The plastic-metal composite article of Claim 1 wherein said first and
second shaped metal parts each independently comprise a metal selected from
25 steel, nickel, chromium, copper, zinc, titanium, aluminum, magnesium, and alloys
thereof.
4. The plastic-metal composite article of Claim 1 wherein said adhesive
has a thickness of from 0.05 mm to 1 mm.

5. The plastic-metal composite article of Claim 1 wherein said adhesive is selected from one-component polyurethane adhesive, two-component polyurethane adhesive, one-component epoxy resin, two-component epoxy resin, cyanoacrylate adhesive, silicone adhesive and combinations thereof.

5

6. The plastic-metal composite article of Claim 1 wherein said adhesive comprises spacers.

7. The plastic-metal composite article of Claim 6 wherein said spacers
10 are substantially spherical and are fabricated from a material selected from glass, ceramic, thermoplastic material, thermosetting material and combinations thereof.

8. The plastic-metal composite article of Claim 1 wherein in said overlap region each of said first and second shaped metal parts have bores having edges,
15 at least some of said bores of said second shaped metal part are aligned with and superposed over at least some of said bores of said first shaped metal part and together define aligned bores having edges, said thermoplastic material molded onto at least a portion of said overlap region extending through at least some of said aligned bores, the edges of said aligned bores being embedded in the
20 thermoplastic material extending there through, thereby fixedly anchoring the thermoplastic material to at least a portion of said overlap region.

9. The plastic-metal composite article of Claim 8 wherein the edges of said aligned bores are deformed edges.

25

10. The plastic-metal composite article of Claims 1 or 8 wherein in said overlap region at least one of said first shaped metal part and said second shaped metal part further comprises deformations selected from at least one of beads and bulges, at least some of said deformations being embedded in the thermoplastic
30 material molded onto at least a portion of said overlap region, thereby further

fixedly anchoring the thermoplastic material to at least a portion of said overlap region.

11. The plastic-metal composite article of Claim 1 wherein each of said
5 first and second shaped metal parts have an open profile, said article further
comprising molded-on thermoplastic reinforcing struts that are positioned
abuttingly within the open profiles of each of said first and second shaped metal
parts, and said molded-on thermoplastic reinforcing struts being continuous with
the thermoplastic material molded onto at least a portion of said overlap region.

10

12. The plastic-metal composite article of Claim 1 wherein the
thermoplastic material molded onto at least a portion of said overlap region
comprises a polymer selected from polyamide, polyester, polyolefin,
styrene/acrylonitrile copolymer, polycarbonate, polypropylene oxide, polysulfone,
15 polyphenylene sulfide, polyimide, polyether ether ketone and combinations
thereof.

13. The plastic-metal composite article of Claim 12 wherein the
thermoplastic material molded onto at least a portion of said overlap region
20 comprises a polymer selected from polyethylene terephthalate, polybutylene
terephthalate, polypropylene, polyethylene, acrylonitrile/styrene/butadiene
copolymer, and combinations thereof.

14. The plastic-metal composite article of Claim 12 wherein said
25 thermoplastic material molded onto at least a portion of said overlap region further
comprises at least one of reinforcing materials and filler materials.